



ANA

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Advanced Air Mobility

Introduction



Name TAKANO, Shigeru Mr.

EMAIL s.takano@ana-ri.co.jp

Executive Advisor, ANA Strategic Research Institute (from Oct. 2019)

July 2016 to July 2019

Director-General, Safety and Security Department,
JCAB, MLIT

Feb. 2014 to June 2019

Director, Flight Standards Division, JCAB, MLIT

April 2012 to Feb, 2014

Director, Office of Air Transport Safety, JCAB, MLIT

Oct. 2009 to March 2012

Director, Airworthiness Division, JCAB, MLIT

April 2005 to Sep. 2009

Senior Air Talks Officer, International Air Transport
Division, JCAB, MLIT

ANA's Overview

ANA

ANA
Care
promise

Scale

Total ANA Group Passengers (FY2019)

59.62 million



Share of Domestic Passengers*2 (FY2019)

No. 1 (46%)

Number of Aircraft (as of the end of FY2019)

307 aircraft total

Wide-Body: 59
Medium-Body: 107
Narrow-Body: 117*
Regional: 24

* Includes aircraft operated by Peach Aviation



ANA Mileage Club Members
(as of the end of FY2019)

36.65 million

ANA Domestic Passengers*1 (2019)

Global
No. 17

Total ANA Domestic and International Passengers*1 (2019)

Global
No. 22

Airports Served by ANA (as of the end of FY2019)

101 airports 48 international airports
53 domestic airports



Airports and Routes Served by Peach Aviation
(as of the end of FY2019)

22 airports **39** routes



Cargo Volume (FY2019)

1,239 thousand tons

Quality

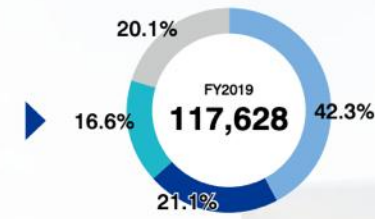
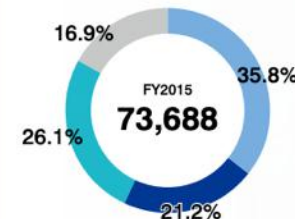
FY2019 results

In-Service Rate 
97.4%

On-Time Departure Rate 
88.7%

On-Time Arrival Rate 
87.5%

Number of Customer Feedback Reports



Complaint
Compliment
Comment / Request
Other

External Recognition

Quality

SKYTRAX (ANA, 2020)

5-STAR AIRLINE
for an **8th**
consecutive year

By Category:

- World's Best Airport Services (2019)
- Best Business Class Onboard Catering (2019)

JCSI (Japan Customer Satisfaction Index) Survey
(ANA, FY2019)

- International Aviation Division, Customer Satisfaction

No. 2



On-Time Performance

Cirium (ANA, 2019)

Asia-Pacific Major Airlines

Network Category: **No. 1**

Mainline Category: **No. 1**

Worldwide Major Airlines

Network Category: **No. 2**

Mainline Category: **No. 2**



ANA's Pioneering DNA

After Covid



1952

Nippon Helicopter (NH) established



1986

International scheduled services



1993

"Marine Jumbo" painting
(Special Airplane Livery)



1999

Joined Star Alliance



2010

Launched "Inspiration of Japan"
(New Staggered Seats)

2011

Introduced the Boeing 787
(Launch Customer)



2012

Launched LCC service

2013

Established ANA Holdings



2015

Operation of StarWars Jet



2018

Established ANA Buigness Jet

2016

Launched Drone/Air Mobility PRJ

2020

Established AVATARIN.INC



ANA

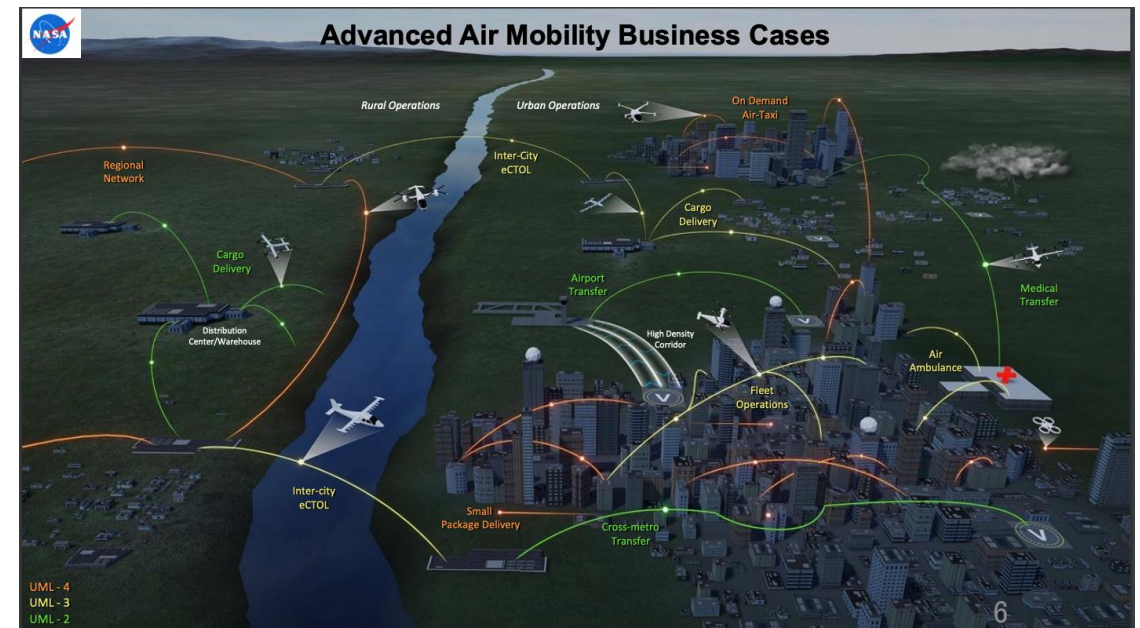
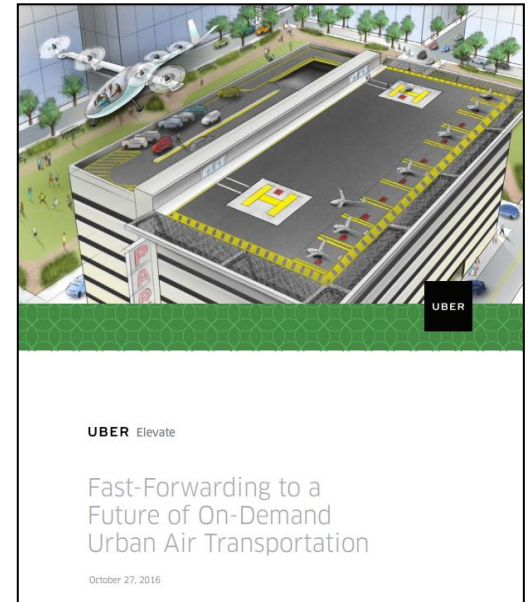
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Advanced Air Mobility

Background

What is AAM (Advanced Air Mobility)?

- Uber proposed a concept of UAM (Urban Air Mobility) in 2016, which intends to integrate eVTOL (Electric Vertical Take-off and Landing aircraft) into transportation systems in urban area. (**Uber White Paper**)
- Later, the concept is expanded to AAM (Advanced Air Mobility), which includes other applications of eVTOL, such as inter-city, regional and rural, cargo, medical transportation.
- There are high expectations on the concept of AAM (e.g. market forecast) and it attracts big investment.

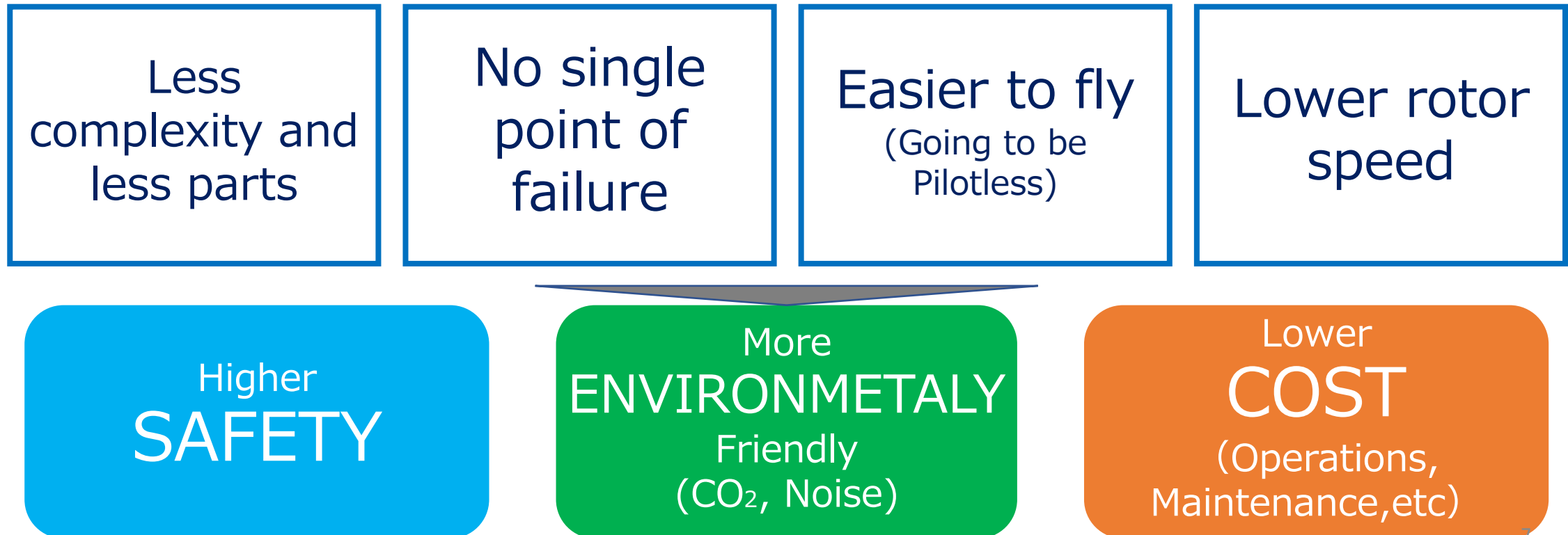


Benefit of eVTOL

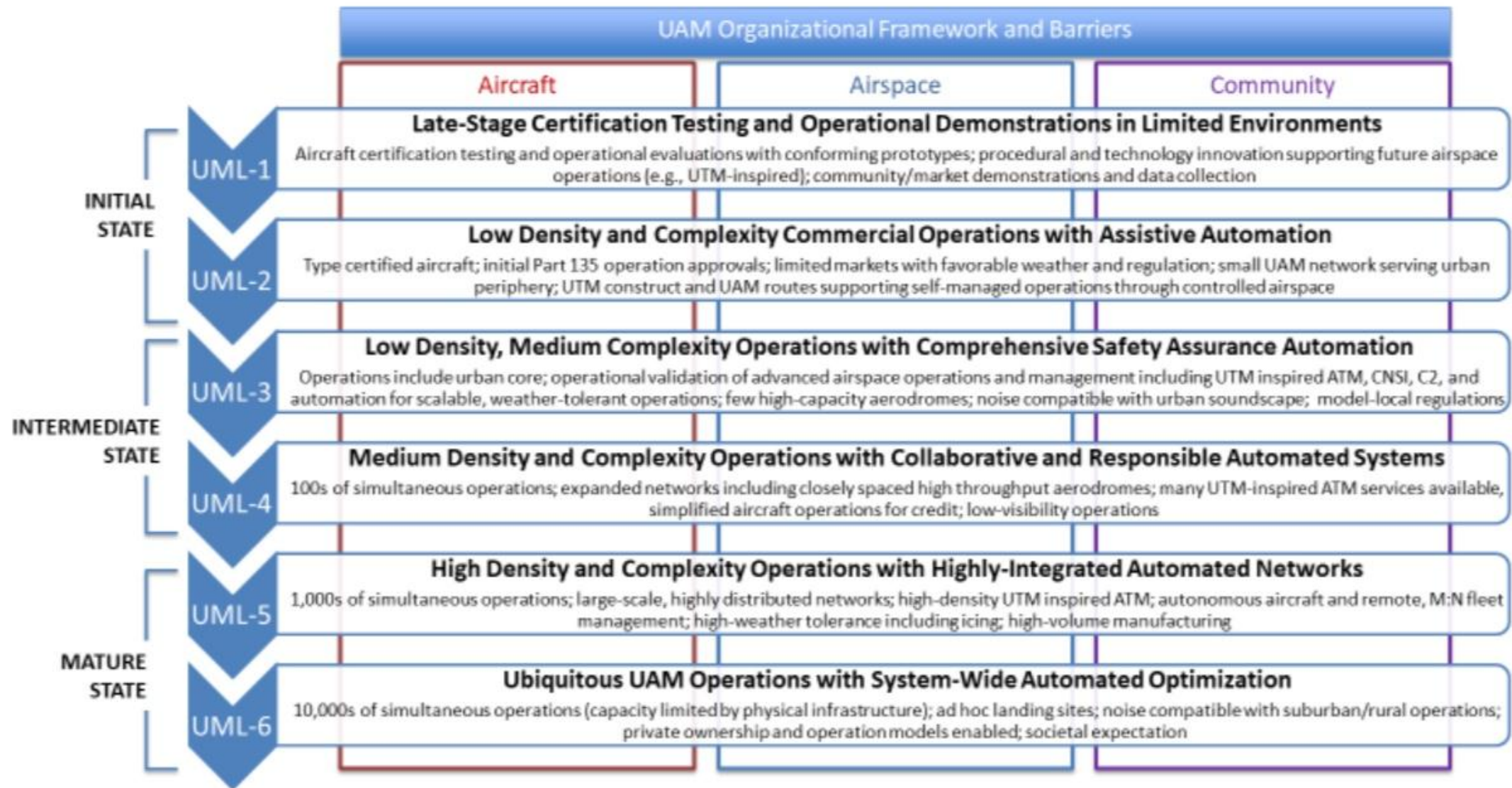
eVTOL can be defined as;

“ an aircraft with multiple electric motors/rotors which provide thrust, and can take-off and land vertically ”

◆ Benefit of eVTOL compared with Conventional VTOL



How AAM will evolve?



UML (UAM Maturity Level) defined by NASA



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Advanced Air Mobility

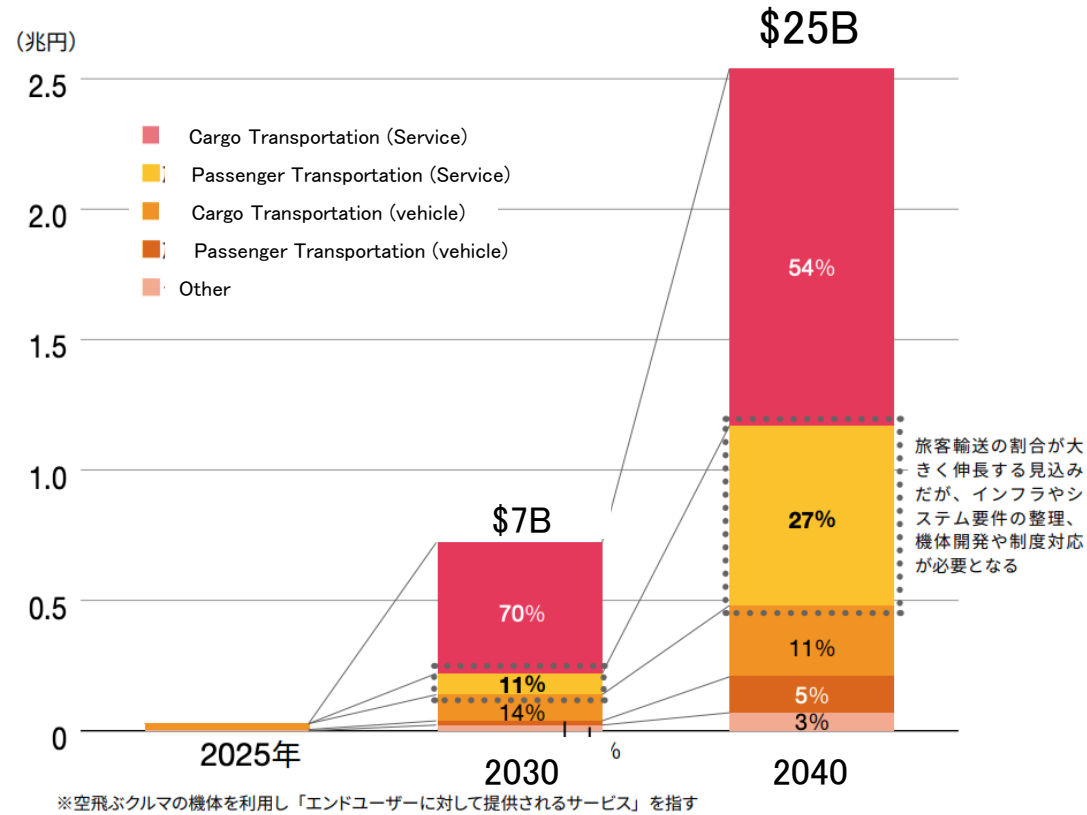
ANA's Plan and Development in Japan

Japan's AAM Market

PwC Japan estimates that Japan's AAM market will grow to 2.5 trillion yen in 2040

AAM Market in JPN by 2040

By 2040, the market scale of AAM may expand to 2.5 trillion yen. The key is to organize infrastructure and system requirements, especially with passenger transportation in mind, as well as aircraft development and institutional design.



Source :PwC Japan

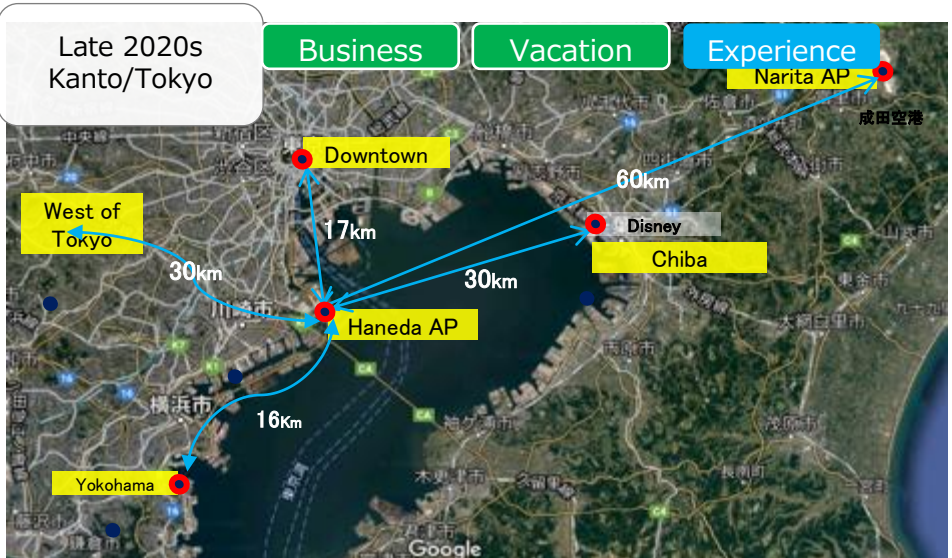
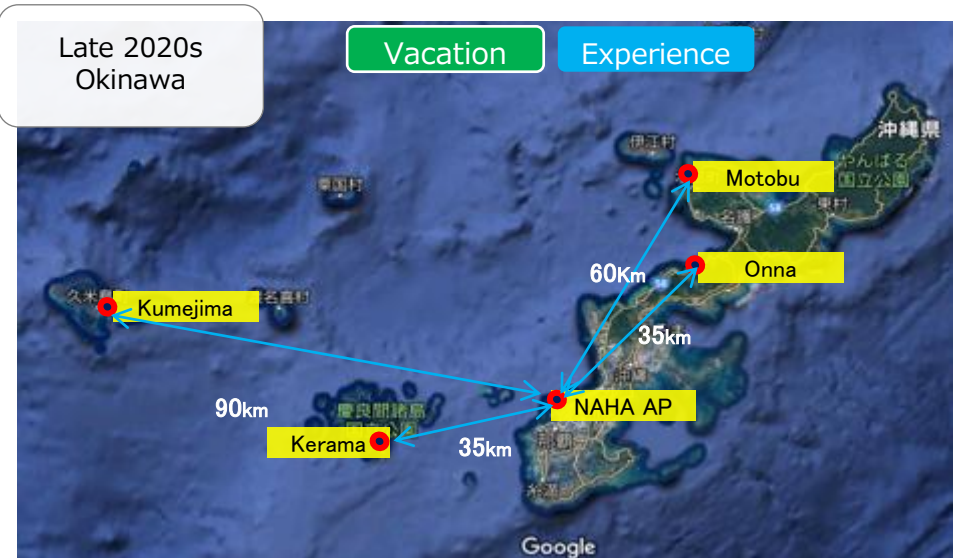
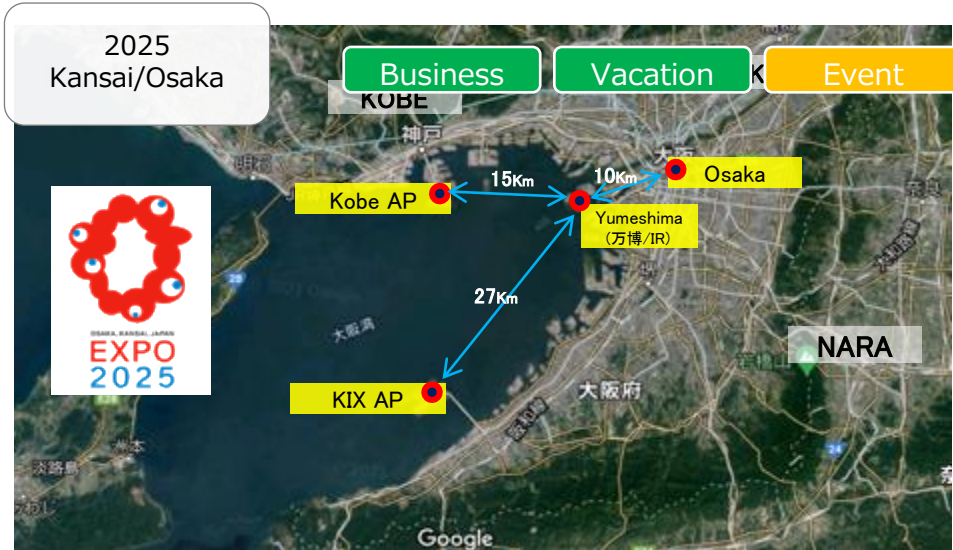
ANAHD's Use Case

Starting with the Airport Shuttle Services, we will expand Services to Intra-City/Inter-City Air Transportation, and to On-Demand Air Taxi Services, to establish Urban Air Mobility and Advanced Air Mobility.

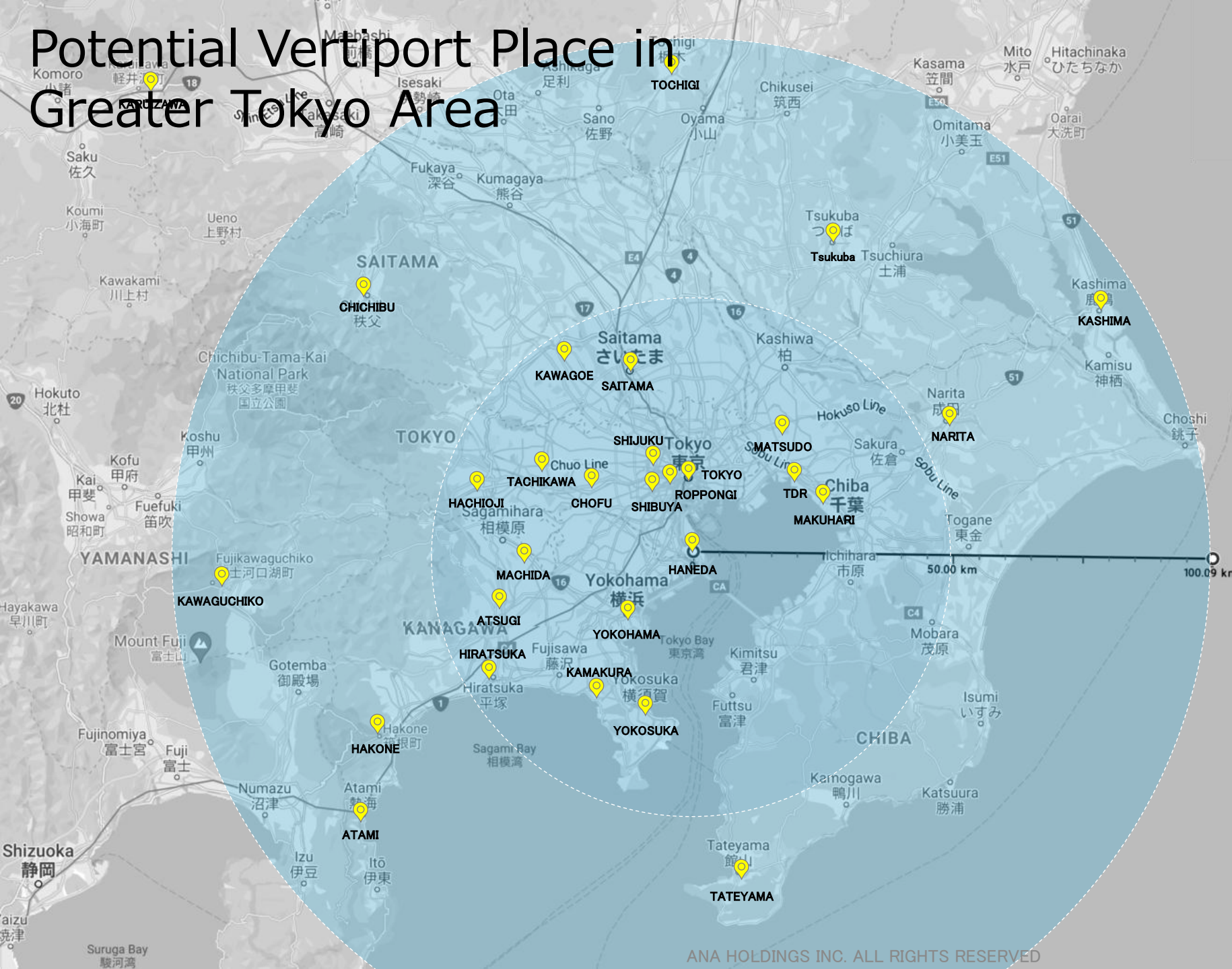
	Description	Network (image)	Time to implementation
Airport Shuttle Service	Airport Shuttle Service Provide passenger transportation services from the airport to the existing heliport, or the new Vertiport, or other transportation hubs and convenient locations in the city.	KIX/UKB-Yumeshima HND/NRT-Tokyo city NGO~Nagoya city OKA~Several resort	2025 and thereafter
Inter City Intra City Transportation	Inter/Intra City Transport Service Expanded Services in Osaka incl. urban services + Similar Services in Tokyo, Nagoya, Okinawa and, then other area	In Tokyo urban area In Osaka urban area In Chubu urban area In Okinawa island area Other area	2026 and beyond
OnDemand Air Taxi	On Demand Air Taxi On Demand Air Taxi Transportation Service. (with High Frequency + High Density Network)	In Tokyo urban area In Osaka urban area In Chubu urban area In Okinawa island are Other area	2030~
Air Metro	Air Metro The aircraft can carry 10 passengers like a bus or van, and will provide transportation as a general public transportation infrastructure.		2035~

Potential Network Area of airport shuttle services

Starting with the Kansai area for Expo 2025, we aim to expand to Kanto, Chubu and Okinawa. In order to secure a "PORT" for takeoff and landing and a "BASE" for maintenance and management of the aircraft.



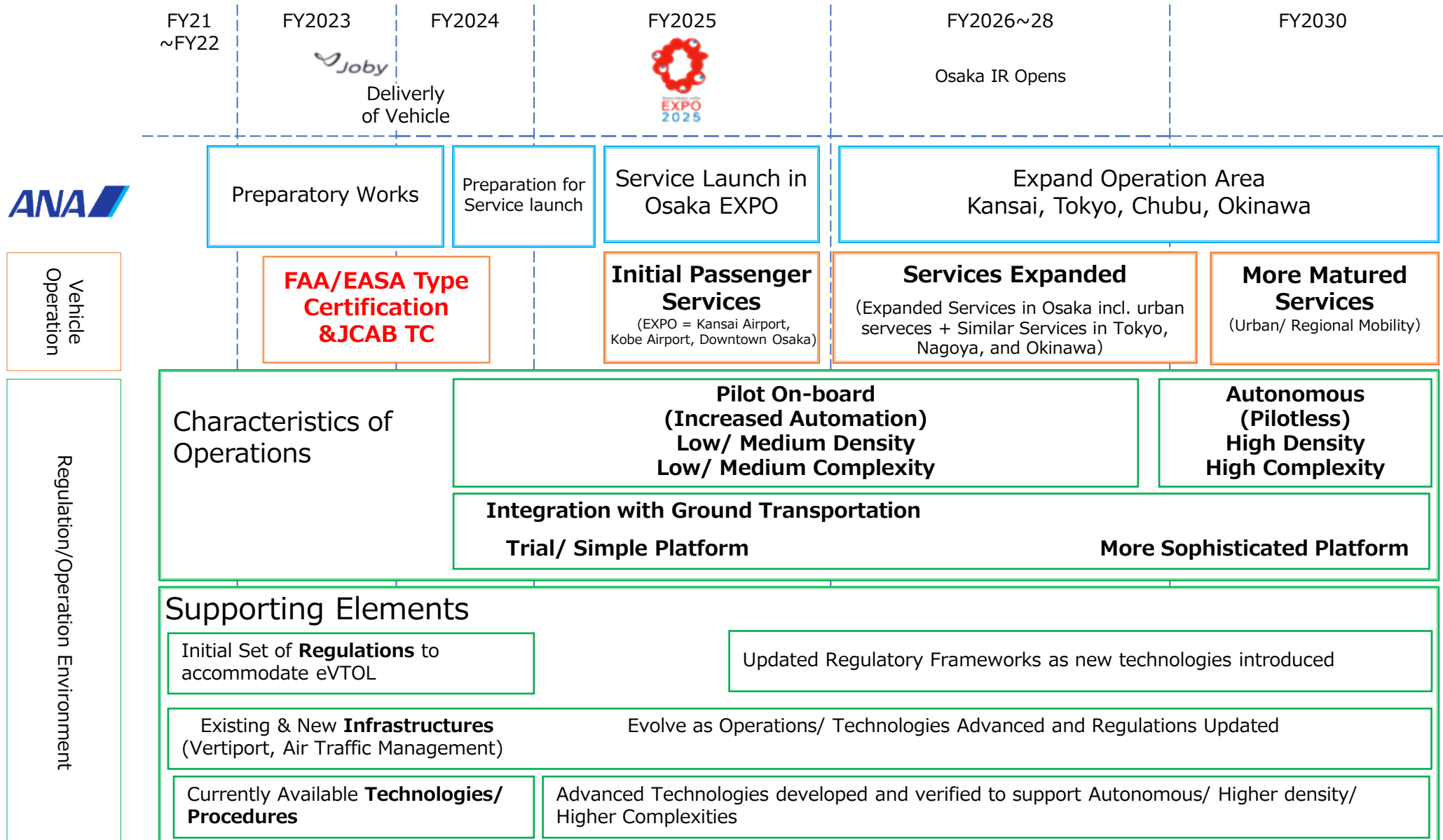
Potential Vertiport Place in Greater Tokyo Area



Tokyo Greater Area eVTOL Potential Network Based on Haneda Airport

Haneda-Shinjuku	~ 30 min
- Car/Train 30-45min	time saving
- eVTOL 8minFLT	
Haneda- Tsukuba	~ 80 min
- car/Train 90-100min	time saving
- eVTOL 20minFLT	
Haneda- Hakone	~ 90 min
- Car/Train 90-120min	time saving
- eVTOL 30minFLT	

ANA's AAM (Advanced Air Mobility) Services (Conceptual Image)



Commitment to AAM by The Japanese Government



JAPANESE GOVERNMENT Action Plan of the Growth Strategy



Realization of Society 5.0

Fintech

Digital
Market

COVID-19

“Air Mobility” Goal

2023 : Start eVTOL Commercial Services

2025 : PAX Services in Osaka EXPO 2025

New Work
Styles

Next Gen
Infrastructur
e

Open
Innovation

Carbon Free
Society

Reforms of Social Security System for All
Generation

Reinforcement of Regional Measures under
Population Decline

Public-Private Council for Air Mobility Revolution

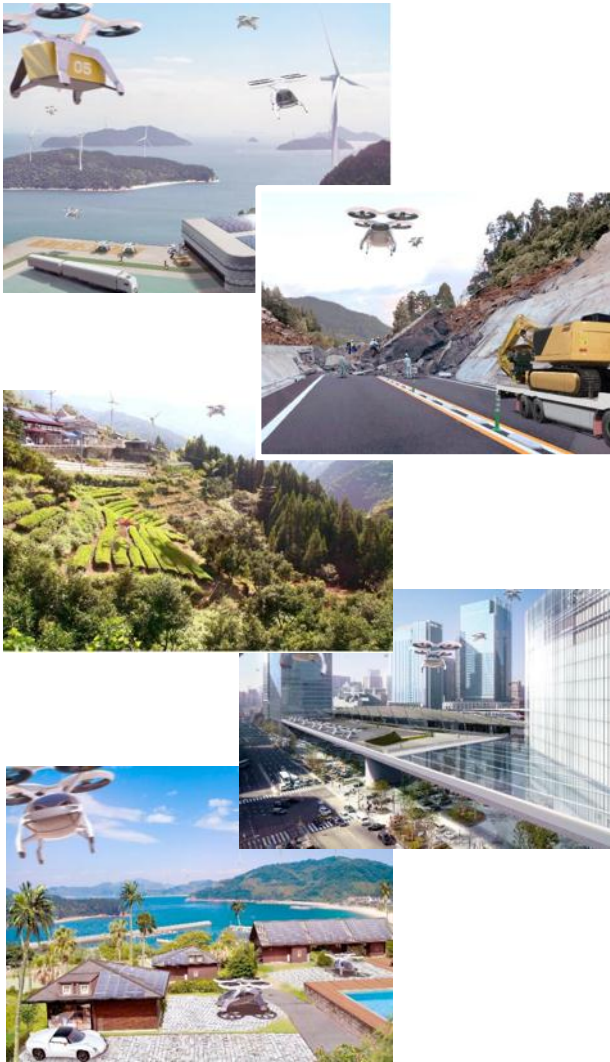
JAPANESE GOVERNMENT
Action Plan of the Growth Strategy 2018

Established Public Private Council for Japan's AAM

Public Sector	Private sector	
<ul style="list-style-type: none"> MLIT JCAB METI Observer <ul style="list-style-type: none"> Ministry of Internal Affairs and Communications Fire and Disaster Management Agency Logistics Policy Division, MLIT General Policy Bureau, MLIT City Policy Division, City Bureau, MLIT River Environment Division MLIT Planning Division, Road Bureau, MLIT 	Academia/Research Institute <ul style="list-style-type: none"> Shinji Suzuki Tokyo University Wataru Nakano Keio University JAXA SJAC AJATS Drone Fund Service Supplier <ul style="list-style-type: none"> ANA HOLDING JAPAN AIRLINE AirX YAMATO HOLDINGS RAKUTEN ORIX 	Manufacturer/Industry <ul style="list-style-type: none"> AIRBUS JAPAN SUBARU BELL Boeing Japan Uber Japan CARTIVATOR SkyDrive KAWASAKI HI Terra Aviation NEC ACSL PRODRONE

Jun, 2020

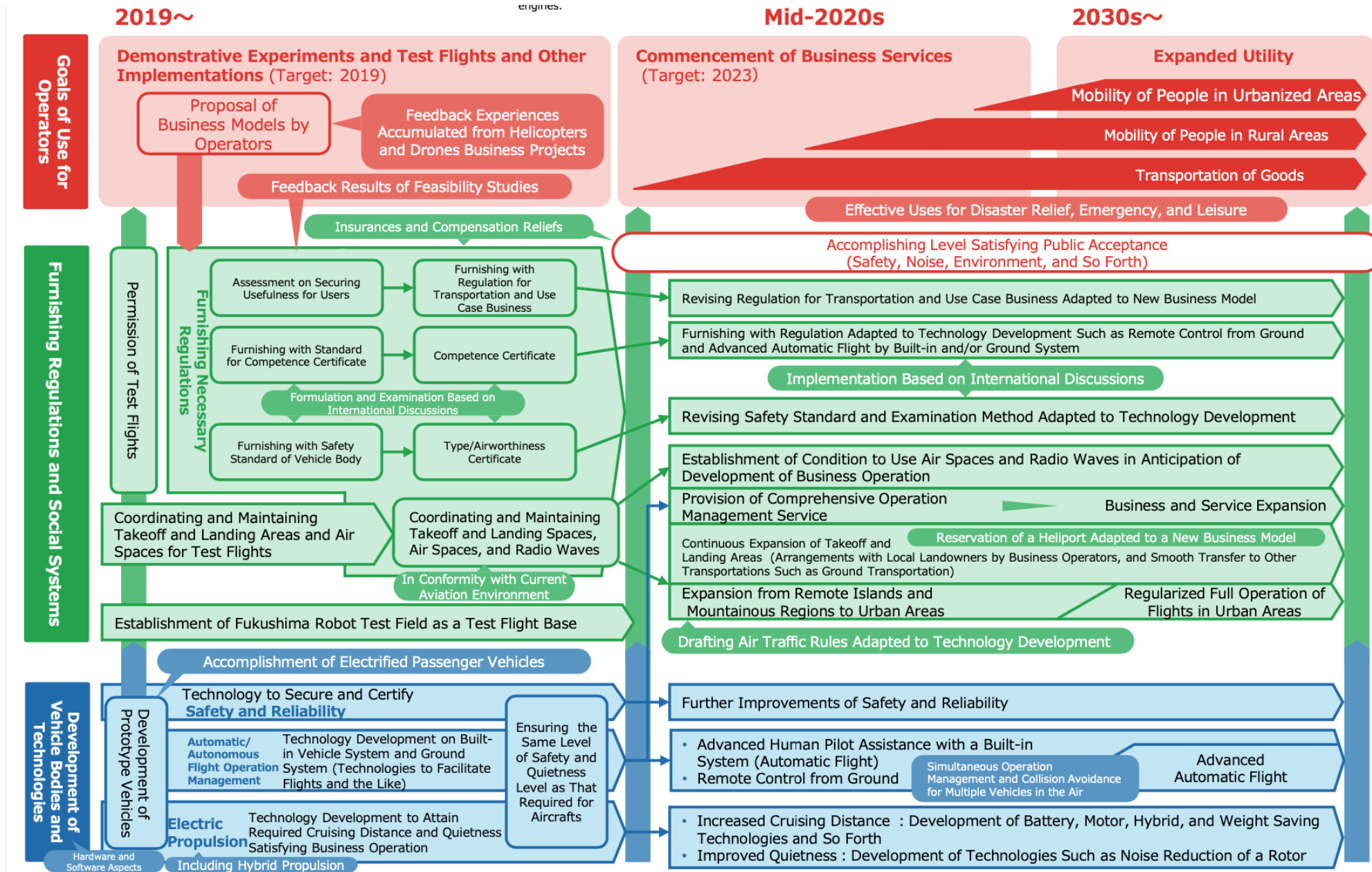
Major usecase



Schedule and agenda in PPC

Aug~Dec 2018 #1~#4 <ul style="list-style-type: none"> Made the roadmap Ministry MLIT and METI also took the stage. 	Aug 2019 Local Government presentation	Mar 2020 #5 <ul style="list-style-type: none"> Business Model Identifying the issue 	Jun 2020 #6 <ul style="list-style-type: none"> Summary of FY19
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Roadmap toward Air-Mobility Revolution (20th Dec, 2018 Public-Private Council for Air Mobility Revolution)



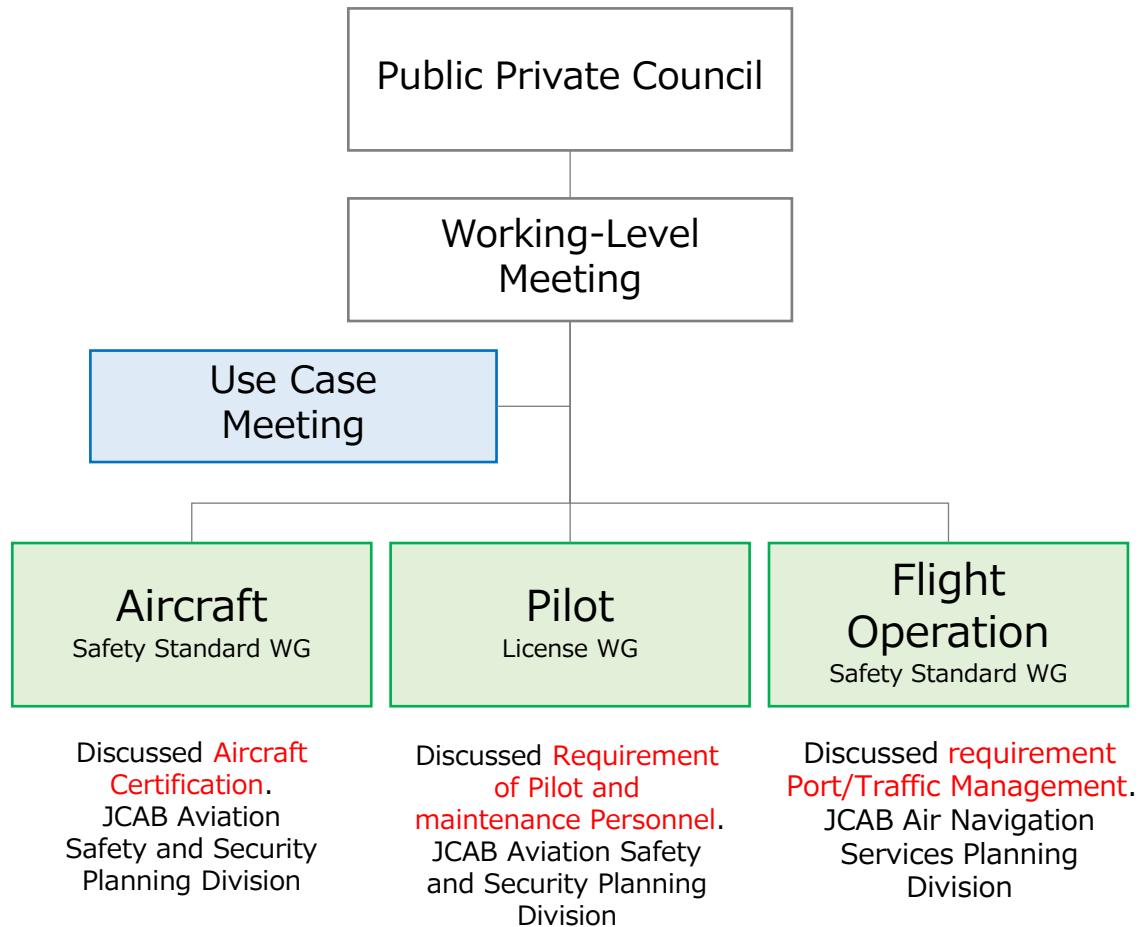
Major Use Case dealt with by public private council

Year	Vision	Major Use Case
2023	Start to Initial operation <ul style="list-style-type: none"> ▪ Passenger transportation service between two points in limited areas ▪ Launch of cargo transportation service in remote island areas 	<ul style="list-style-type: none"> ▪ Multicopter type, 2passengers, All Electric, Pilot-On board, MTOW5–600kg, VFR, Altitude 50–150m, the existing Helipad
2025	Start to commercialization of transportation <ul style="list-style-type: none"> ▪ Multiple fixed-route, scheduled services, such as airport shuttle ▪ Cargo services in urban areas. (Pilotless) 	<ul style="list-style-type: none"> ▪ Osaka Bay Area (Osaka City/Expo island/Airport) ▪ Multicopter/Vectored Thrust, 2–5 passenger, All-Electric, Pilot On board, New Vertiport, the existing helipad, VFR, congested airport.
2026~	Expand to transportation service/Medical and Emergency Services (To be defined)	
2030~	More Expansion of networks and On Demand Ops (To be defined)	

Public Private council for Japan's AAM

Public Private Council for Future Air Mobility Revolution was established in AUG 2018, released "AAM Development Roadmap" in DEC 2018 as a result of its initial deliberation.

It plans to revise the "Roadmap" in FY2021.



Recent work and future actions

- Each WG have identified issues to be resolved under the current framework including regulations and procedures for the services envisaged until 2025.
- In 2021 and onward, considerations and discussions will be conducted and necessary actions will be taken in a timely manner, for the resolution of those issues to help realize commercial services of eVTOL, including setting-up of various technical and safety standards.
- In particular, Concept of Operation of ATM for initial stage of implementation will be finalized in FY21

OSAKA EXPO 2025 and AAM

Master Plan released by the Osaka Expo Committee (December 2020) has incorporated a vertiport (the Mobility Experience Area) for eVTOL services.



出典 : <https://www.expo2025.or.jp/overview/masterplan/>

Osaka and other Local Governments are supportive for realization of eVTOL services

Osaka

Osaka governor is aggressive to realize of eVTOL operation.
The public private council was established for OSAKA AAM.



Fukushima

Robot Test Field “50ha” in Fukushima.



Mie

One of the plans is to connect ISE shrine as major sight seeing spot in Mie with nearest international airport Centrair.



Tokyo

There is huge population in Tokyo greater area



Barriers and Challenges

Short Term (Airport Shuttle Services)

Going through necessary regulatory requirements

Certification of eVTOL/ Licensing of Pilot/ Air Operator Certificate

Securing Vertiports

Flexible access to congested airports

Access to existing/ new heliport in big cities

Safe and Reliable Services

Operations in bad weather

Public Acceptance

Particularly important to access to the populated area

Safety, Environment, Privacy and Annoyance. Understanding from the public/ community

Scalable

Flexibility in ATM (Air Traffic Management) systems/ procedures, maintaining co-existence with other traffic

Barriers and Challenges

Longer Term

(Future Services: High Density, High Complexity, Fully Automated/ Autonomous)

Update Regulatory Framework, in parallel with technological development

Vehicle Automation/ Pilotless operations/

New Technologies (V to V Com., DAA, Interface with new traffic management, etc.)

Innovative Concept in ATM

Airspace dedicated to AAM

Unique set of rules and procedure for AAM/ Automated traffic management

Safe and Reliable Services


Security

Cyber Security

Security in operations without onboard pilot

Public Acceptance

Are PAX OK with pilotless operations?

An aerial photograph of a dense urban landscape, likely Tokyo, featuring numerous skyscrapers and a mix of building styles. In the foreground, a large, white, four-rotor drone is positioned as if it's about to land or has just taken off from a rooftop area. The rooftop has solar panels and a few small figures of people. In the sky, several other smaller drones are visible, flying at different altitudes. The overall scene suggests a focus on urban drone technology.

Thank you!
Comments or Questions